

AU/AWC/224/1999-04

AIR WAR COLLEGE

AIR UNIVERSITY

**CONFLICT IN THE 21ST CENTURY:
COUNTERSTRATEGIES FOR THE WMD TERRORIST**

by

Linda E. Torrens, Lt Col, USAF

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: Col. Clark Lee

Maxwell Air Force Base, Alabama

April 1999

Disclaimer

The views expressed in this academic research paper are those of the author and do not reflect the official policy or position of the US government or the Department of Defense. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.

Contents

	<i>Page</i>
DISCLAIMER	ii
PREFACE	iv
ABSTRACT	v
INTRODUCTION.....	1
The Terrorist Threat.....	3
An Abbreviated History.....	5
NUCLEAR TERRORISM	9
Achieving Nuclear Capabilities	9
Obtaining Materials	9
Weaponization	11
Delivery.....	12
CHEMICAL AND BIOLOGICAL TERRORISM	15
THE COUNTER-STRATEGIES.....	24
Political Strategies	24
Economic Strategies.....	27
Psychological Strategies	30
Military and Law Enforcement Strategies	31
Border policing	32
Court and Legal Changes.....	32
Police Training.....	33
Military Options.....	34
Detection and Defense	35
The Importance of Intelligence.....	37
Event Response	38
CONCLUSIONS	43
BIBLIOGRAPHY	45

Preface

Originally, I intended to write a research paper covering the subject of transnational threats. I was intrigued by the future security environment and felt that these threats offered a good opportunity for interesting and informative research. However, as I began the research, I found an overabundance of information in this area. Quickly, I found that I could not do the entire topic justice in only 25 pages. This paper thus became focused on the transnational threat of terrorism—specifically the terrorist who chooses to use weapons of mass destruction. My coursework at the Air War College spawned interest in this subject. The Air War College’s Special Operations elective and the Counterproliferation elective both touched on the subject of terrorism. Each of these courses provided the opportunity to delve into subjects which I previously knew little about. The instructors for these courses, Colonel Lee, Colonel Sutton and Dr Schneider, fostered student learning and involvement. I especially enjoyed the field trip to the Center for Disease Control in Atlanta where I learned much about the frightening aspects of bioterrorism. I also wish to thank my husband for his patience as I repeatedly invaded our home life with conversations on the unpleasant subjects of WMD and terrorism. His insightful opinions greatly influenced this work.

Abstract

For years, the US military has prepared to fight against opponents armed with nuclear, biological, and chemical capabilities. These weapons of mass destruction (WMD) in the hands of traditional, state actors have been at the forefront of US defense planning. The end of the Cold War and the demise of the Soviet Union have allowed us to focus on new threats to US security. WMD terrorism will play a larger role in this new uncertain security environment for several reasons. First, transnational threats are no longer kept in check by a bipolar world. Secondly, terrorists may have greater access to WMD materials today than ever before. And thirdly, the information revolution has made not only weaponization knowledge freely available, but has also improved the organizational capabilities of diverse terrorist groups. This paper examines the WMD terrorist threat and addresses counter-strategies for reducing the risk. Conclusions include a need for heightened awareness of the threat. Recommendations include strengthening domestic and international controls and legal structures regarding WMD materials, using diplomatic pressure and economic means to deter or reduce the likelihood of WMD terrorism, and improving defensive and responsive capabilities.

Chapter 1

Introduction

With the end of the Cold War, the United States entered a period of strategic uncertainty. The security environment changed from one of known enemies to one of unidentified, emerging threats. For most of the twentieth century, the nation-state has been at the center of US strategic planning. Many analysts agree that in the future, however, non-state actors will be the more prevalent threat to US interests. Rogue nations may continue to challenge our goals in regional areas, but terrorists may present the most direct threat to US vital interests. In this uncertain security environment, Iraq or Korea may not be the most likely candidate to resort to nuclear violence. Rather, the most real threat may be a terrorist organization with the will and capability to use a nuclear, chemical, or biological weapon against America's territory or citizens.

A terrorist with a weapon of mass destruction (WMD) has the ability to greatly affect America's vital interests simply due to the scale of the attack. Potentially, the US could lose more Americans due to a domestic WMD terrorist attack than lost during the Vietnam and Korean wars combined. The safety of US military forces could also be jeopardized by the WMD terrorist; thus, the terrorist with nuclear, biological, or chemical (NBC) capability could influence US security actions abroad.¹ The nuclear terrorist does not require a large arsenal to achieve his purposes since the explosion of a single crude device could alter US

policies.² Similarly, a highly infectious biological weapon released in small quantities could affect thousands of US personnel. But the main object of terrorism is not necessarily to kill military forces. The terrorist usually desires political or social change. The target might be a contentious peace process, a specific national or foreign policy, a contested election, or a change in social behavior.³ Our future policies and strategies in Saudi Arabia, Israel, South Korea, Latin America, and even Europe could be shaped by the WMD terrorist.

Although terrorists have always been able to directly threaten US territory, recent events demand an increased focus on the domestic terrorist threat. Terrorism hit an all time high in the 1980s and today, many analysts contend that the terrorism epidemic has been contained. However, a single terrorist organization with the will and ability to use WMD could make the violence of the last decade seem minute by comparison.⁴ With the breakup of the Soviet Union, the US has become the focus of world action. The US has been thrust into the position of world policeman with every legitimate interest vying for US attention and resources. Ironically, America's desire to promote stability around the world may be the cause of its vulnerability.⁵ US forces are more active around the world than they have ever been before with thousands of personnel deployed across the globe. Each one of these deployments could be perceived as the US "taking sides." Each one of these deployments could trigger anti-US hostilities or actions.

While US assets and citizens abroad have been an attractive target for terrorists, the World Trade Center and Oklahoma City bombings indicate that the US mainland itself is no longer isolated and secure from a direct terrorist threat.⁶ Furthermore, terrorist organizations have demonstrated the desire to use weapons of mass destruction to further their violence. The Aum Shinrikyo attack in Tokyo and the World Trade Center bombing

both involved attempts to cause mass casualties using previously taboo materials—weapons of mass destruction. While some claim that these events do not necessarily indicate anything about the future, the growing possibility that terrorists might gain access to WMD and have the desire to use such weapons against American targets must be considered. This paper will examine the WMD terrorist threat against United States' interests. Motivations and methodologies of WMD terrorism will be discussed and possible counter-strategies examined for reducing the risk.

The Terrorist Threat

There is a fine line between the terrorist and the simple criminal. Both may involve the use of violence and illegal acts to achieve purposes. While criminals use force to directly achieve goals, the terrorist often resorts to indiscriminate violence in order to influence public opinion or political decisions. Terrorism acts on fear which in turn influences behavior.⁷ This paper addresses terrorist acts which use or threaten indiscriminate or symbolic violence for political, religious or other purposes.

Terrorism can take several forms. Individual terrorists are the least dangerous from a WMD perspective because they usually do not have the resources or expertise to acquire WMD capability. Individual terrorists are also, on the other hand, the most difficult to identify and constrain. Organized terrorist groups can be classified by size, location and focus. Terrorist organizations range from small to extremely large. The Aum Shinrikyo claimed at its peak to have almost 40,000 members worldwide, and even after its breakup still has 5,000 loyal followers by some estimates.⁸ Terrorist groups are either international or domestic in nature. Some better known international terrorist groups include the Hamas, Palestine Islamic Jihad, and the Japanese Red Army. Domestic terrorists include individuals

like Ted Kaczinski (the Unabomber) and Timothy McVeigh as well as organizations such as the Ku Klux Klan, the Arizona Patriots, and the White Patriot Party.⁹ Groups like the Aryan Nation may have both domestic and international ties. Terrorist groups can also be categorized by focus or objective. Many groups have political objectives. The Irish Republican Army is one such example. Other groups have religious fanaticism as their organizing tenet. Still other terrorists focus on social change. Abortion bombers fall into this category. Terrorists may also be independent or state-sponsored. State-sponsored groups are provided funds, equipment, or other support from state actors. A terrorist group with substantial assets or support would be more able to acquire WMD capabilities; however, some types of chemical and biological weapons do not require ample funds. Additionally, terrorist organizations sometimes link up to share resources and assets. A particularly dangerous combination in the future might be the cooperation and coordination between an international terrorist organization and a domestic group.

Today's terrorist is also more likely to consider weapons of mass destruction than in the past because the public has become insensitive to other, lesser acts of terrorism. Aircraft hijackings have become somewhat mundane. Car bombs affect few people and today, the media reacts to acts of terrorism with only a sound bite or a headline. The public's acceptance of such events as routine gives these smaller acts of violence an aura of legitimacy. One way for the terrorist to recapture public attention is to resort to higher levels of violence.¹⁰ This motivation in conjunction with easier access to materials makes WMD violence attractive to the terrorist.

Weapons of mass destruction include nuclear, chemical, and biological weapons. The nuclear terrorist uses nuclear effects to achieve objectives. Nuclear terrorism could come in

the form of a nuclear bomb, a power plant accident, or exploitation of nuclear wastes. Chemical weapons use toxic substances to maim, kill or incapacitate persons or animals. Biological weapons use natural elements to affect persons or animals and could be used on crops, fuels, food, or water sources.

An Abbreviated History

Man has resorted to the use of weapons of mass destruction repeatedly throughout history. As early as 400 BC, the Scythians shot arrows laced with infected blood and manure in an attempt at biological warfare. The Mongols in the 1300s catapulted infected and decomposing bodies across enemy lines which helped spread the Bubonic plague across Europe.¹¹ Agents and delivery methods of WMD have become more sophisticated since these early instances of WMD warfare, but this had not detracted entities from trying to acquire the weapons. In the last two decades alone, there have been dozens of WMD events. While nuclear, chemical, and biological capabilities have in the past been the purview of state actors, more and more individuals and non-state groups are trying to acquire weapons of mass destruction. Furthermore, the US is not immune to terrorism and the effects of these weapons. In the last eight years, there were nearly 20 domestic terrorism incidents.¹² From the lacing of Tylenol pills in the 80s to the Rajneesh cult's salmonella attack in Oregon in 1986, individuals and groups have attempted to cause mass casualties and deaths for private motives.

Terrorist desires to obtain WMD capabilities have grown in recent years and no continent remains untouched. In 1984, the French police raided German Red Army Faction houses and seized flasks filled with one of the world's most lethal biological substances.¹³ In 1992, German police opened 158 cases involving nuclear smuggling, and by 1994, the

count was up to 267.¹⁴ Between 1992 and 1995, the Russians prosecuted 19 Russian citizens for theft of fissile materials.¹⁵ In 1995, the Aum Shinrikyo cult released the highly toxic chemical Sarin into a Japanese subway station, and even though the cult made multiple production and delivery mistakes, the result was still 12 deaths and 5,100 casualties.¹⁶

While this was a chemical nerve agent attack, the Aum Shinrikyo cult also dabbled in biological and nuclear materials. They had three times previously attempted to release anthrax and botulinum toxin. The cult sent members to procure ebola virus samples from Africa and tried to obtain nuclear fissile materials in Australia. Neither the media nor law enforcement officials of any nation paid much attention to the cult's activities.¹⁷ Similarly, terrorist and extremist groups within the United States often go unnoticed. The average US citizen did not even hear about the pair in Minnesota who were convicted for manufacturing biological weapons.¹⁸ Nor did the May 1995 arrest of an Ohioan with plans to spread freeze-dried bubonic plague make the front pages.¹⁹ Experts involved in the case believe that the World Trade Center bomb was an attempt to create a cyanide cloud which would kill or maim thousands, yet few debated the implications.²⁰ In December of 1995, Army veteran Thomas Lavy was captured with enough Ricin to kill 30,000 people.²¹ And as recently as November of 1998, letters were sent to Planned Parenthood clinics threatening anthrax attacks.²²

The use of chemical and biological weapons in warfare is not a new phenomenon. The desire of terrorist groups or individuals to obtain NBC capabilities for subversive motives coupled with the ability of many groups to do so does, however, change the face of terror. No longer is terrorism confined to state sponsorship. Individuals, extremist groups, fanatics,

ideological zealots, religious radicals, and even organized crime syndicates are exploring or experimenting with weapons of mass destruction.

Notes

¹ Graham T. Allison, Owen Cote, Richard Falkenrath and Steven E. Miller, *Avoiding Nuclear Anarchy: Constraining the Threat of Loose Russian Nuclear Weapons and Fissile Material* (Cambridge, MA: MIT Press, 1996), 64.

² *Ibid.*, p. 57.

³ Anthony H. Cordesman, "Terrorism and the Threat from Weapons of Mass Destruction in the Middle East: The Problem of Paradigm Shifts," (Working Draft, Middle East Studies Program, October 22, 1996), 7.

⁴ Yonah Alexander, Yuval Ne'eman, and Ely Tavin, ed., *Future Terrorism Trends: Analysis of Terrorist Warfare in the World Arena* (Washington DC: Global Affairs, 1991), 25.

⁵ Richard Betts, "Weapons of Mass Destruction," *Foreign Affairs* 77, no. 1 (Jan/Feb 1998), 28.

⁶ *Ibid.*, 29.

⁷ "Terrorism: Can You Trust Your Bathtub," (Terrorism Research Center, September 12, 1996), 1-2; on-line, Internet, <http://www.terrorism.com/terrorism/bathtub.html>.

⁸ US Department of State, *Patterns of Global Terrorism: 1997* (Washington DC: Government Printing Office, April 1998), 56; and "Chemical & Biological Arms Control Dispatch," (Chemical and Biological Arms Control Institute, October 16-30, 1998), on-line, Internet, <http://www.cbaci.org>.

⁹ Brent L. Smith, *Terrorism in America: Pipe Bombs and Pipe Dreams* (New York: State University Of New York Press, 1994), viii-5.

¹⁰ Alexander, 27.

¹¹ Col Jim Davis, "Biological Warfare," lecture handout, Counterproliferation Issues Elective, Air War College, Maxwell AFB, Al, October 1998, 1.

¹² Federal Bureau of Investigation, *Terrorism in the United States: 1996*, Counterterrorism Threat Assessment and Warning Unit (Washington DC: Government Printing Office, 1997), 26.

¹³ Terry N. Mayer, "The Biological Weapon: A Poor Nation's Weapon of Mass Destruction," in *Battlefield of the Future*, ed. Barry R. Schneider and Lawrence E. Grinter. (Maxwell AFB, Al: Air University Press, September 1995), 5, on-line, Internet, <http://www.airpower.maxwell.af.mil/airchronicles/battle>.

¹⁴ Cordesman, 36.

¹⁵ *Ibid.*

¹⁶ *Ibid.*, 26.

¹⁷ Mayer, 7.

¹⁸ Sopko, "The Changing Proliferation Threat, in *World Politics* 97/98, ed. Helen Purkett (Guilford, CT: Dushkin/McGraw Hill, 1997), 221-222; and *Terrorism in the United States: 1996*, 22.

Notes

¹⁹ National Governor's Association Issue Brief, "Terrorism: Is America Prepared?" (Washington DC: Natural Resources Policy Studies Division, Feb 2, 1997), 2, on-line, Internet, <http://nga.org/Pubs/IssueBriefs/1997/970202terrorism.asp>.

²⁰ In May 1994, the judge in the case stated that the World Trade Center bomb was laced with cyanide. Fortunately, the chemical burned up in the explosion and was ineffective. His belief that this could have been a WMD incident may be due to the fact that police found large amounts of cyanide in the defendants' possession.

²¹ "Terrorism: Is America Prepared?", 2.

²² "Authorities await Test Results on Threat Mail sent to Clinic," *Montgomery Advertiser*, 1 Nov 98.

Chapter 2

Nuclear Terrorism

Achieving Nuclear Capabilities

There are three main aspects to the nuclear terrorism scenario. First, the terrorist must obtain nuclear materials. Next, the material must be weaponized, and finally the weapon must be delivered to the target. Access to fissile materials has always been considered the most difficult part of the task. Iraq, after all, spent billions of dollars and over a decade attempting to produce fissile materials and had not acquired the capability by 1991. However, since the nuclear terrorist is not concerned with a large stockpile of weapons, he does not need to actually produce fissile materials. He needs only to procure them and acquiring them today may be easier than ever.

Obtaining Materials

During the Cold War, there was little concern about the safety and security of the Soviet Union's 15,000-25,000 nuclear weapons.¹ But with the breakup of the totalitarian state, the possibility of nuclear "leakage" has emerged. Besieged by political instability and economic distress, Russia is experiencing rampant crime and corruption.² Its central government is weak, and the military (which controls most of Russia's tactical nuclear weapons) is on the verge of collapse. Many officers in the Russian army have not been

paid for months, and every week thousands of Russian soldiers die of starvation.³ In one military district, 27 tanks, over 100 APCs, 4000 guns and 180,000 mines were reported as simply “missing.”⁴ It is not a far leap to assume that nuclear weapons or materials might be pilfered and sold to the highest bidder. Indeed, several incidents have already occurred. In November of 1993, a Russian Navy captain stole 10 pounds of highly enriched uranium (HEU). In May and June of 1994, police found 5.6 grams of super grade plutonium in a garage in Germany and 0.8 grams in Bavaria. Near-weapons grade plutonium was seized at the Munich airport in August 1994 and 6 pounds were seized in Prague in December.⁵ These incidents represent only the *known* leakage of nuclear materials from Russia into Europe, and with thousands of miles of borders, the more likely route for such materials might be through the Caucasus or Russia’s eastern seaboard.⁶ There are thousands of pounds of weapons-usable materials and nuclear weapons spread across hundreds of sites in Russia, and many of these sites may be guarded by men whose paychecks are in arrears.⁷ In addition, Russia’s civilian nuclear power plants suffer from a gross lack of security.⁸ The near non-existent security of Russia’s nuclear infrastructure makes the acquisition of nuclear materials by terrorists credible.⁹

It is generally agreed that the most difficult aspect of building a nuclear weapon is obtaining the fissile materials.¹⁰ Only 40 pounds of HEU are needed to produce a simple implosion device. Twenty pounds of plutonium or 100 pounds of HEU could be transformed into a gun-type weapon that would produce a 15 to 20 kiloton yield.¹¹ Ten pounds of plutonium could be molded into something the size of an apple and easily smuggled.¹² And for those who thought smugglers might be deterred by the radioactive

nature of these materials, both plutonium and HEO are relatively safe to handle. Plutonium need only be clad with metal to prevent oxidation and it can be safely handled without further shielding.¹³ It also cannot be easily detected.

Besides the possible leakage of Russian nuclear materials, Europe and Japan are developing large commercial plutonium industries for their power plant sectors. These plants will annually process more plutonium than possessed by the US and Russia combined.¹⁴ All of this material must be manufactured, processed, and transported; and each stage in the process increases the risk of lost, hijacked, or stolen materials. Power plant wastes also offer opportunities for the nuclear terrorist. Nuclear waste materials do not have the same security safeguards as reactor materials and waste materials contain neptunium. Neptunium is a material that is “every bit as fissionable as the better known trans-uranic elements,” and there are *tons* of these materials lying in waste sites around the world.¹⁵ The shear quantity of nuclear materials in the world today increases the likelihood of security shortfalls.

Weaponization

Assuming the terrorist can acquire fissile materials, his next challenge is to weaponize it. Since the 1970s, many experts have believed that weaponization is not particularly difficult.¹⁶ There are tens of thousands of people worldwide with the education or experience required for a terrorist organization to build a crude bomb.¹⁷ Former Soviet scientists may be willing to sell their nuclear knowledge; however, the expertise of Soviet scientists might not even be needed.¹⁸ In the 1960s, a 21-year-old Princeton physics major designed a workable atomic bomb in only 4 months.¹⁹ And

since 1960, the information revolution has made bomb manufacture, explosive, and nuclear design theory is freely accessible on the Internet and in public media.

Delivery

Once the nuclear material is weaponized, there is still the matter of delivery against US interests. The US military is geared for the traditional means of weapons delivery via long range aircraft or missile. However, it is likely that the nuclear terrorist will rely on simpler, less sophisticated means. Historically, terrorists have used simple car bombs, suitcase bombs, mail bombs or other hard-to-detect methods. A nuclear device could be exploded in the same manner or transformed into a gun. Alternatively, a nuclear device could be shipped and exploded in harbor or it could be moved via UPS to its destination. The delivery of a 15-kiloton weapon need not be that accurate to meet the terrorist's objectives.

An alternative to weaponization is power plant sabotage. As of 1989, there were 370 nuclear power plants in 27 countries with almost as many under construction around the world.²⁰ Today there are over 65 countries with commercial nuclear power.²¹ After Chernobyl, a report by the Nuclear Regulatory Commission estimated that a serious "accident" could result in 3,300 immediate deaths, 45,000 persons with early illness, 240,000 long-term illnesses, and 30,000 genetic defects.²² Economic losses for such an accident were estimated around \$14 billion.²³ Obviously, the nuclear terrorist able to cause such an accident could make quite a statement.

Although we don't know the exact likelihood of a nuclear terrorism incident, we do know that the ability of a terrorist organization to acquire such a capability has never been as great as it is now. Recent events in Japan prove that fanatics exist who are

willing to attempt mass destruction. The nuclear terrorist has two main challenges. The first is the cost of fissile materials. None of the known smuggling cases involved enough nuclear material to build a weapon and the purchase of a significant amount of radioactive material and technology could easily run into the hundreds of millions of dollars.²⁴ Thus, the highest risk of nuclear terrorism may be by state-sponsored groups or proxy terrorists. In addition, the ease of weaponizing might be overstated. Designing a bomb may be substantially simpler than actually building a nuclear weapon. A crudely designed weapon will likely be large, thus the terrorist's transport and delivery challenges immensely increase. For these reasons, the terrorist desiring to produce mass casualties may turn to chemical or biological weapons.

Notes

¹ Allison, 34.

² Ibid., 7, 30.

³ Lt Col Kathleen Sweet, "Russia: a Multidisciplinary Approach," lecture, Air War College, Maxwell AFB, Al., October 1998. Of a military of over 1.5 million members, it is estimated that Russia loses 10% of their military force every year due to suicide or starvation.

⁴ Ibid; and Karen Torres, "Russia: A Multidisciplinary Approach," lecture handout, Air War College, Maxwell AFB, Al., Oct 1998.

⁵ William C. Potter, "Nuclear Leakage from the Post-Soviet States," in *Pulling Back from the Nuclear Brink: Reducing and Countering Nuclear Threats*, ed. Barry R. Schneider and William L. Dowdy (London: Frank Cass Publishers, 1998), 108-112; and Allison, 11, 27, 37.

⁶ Allison, 27, 37.

⁷ Ibid., 8.

⁸ Ibid., 15.

⁹ Ibid., 7.

¹⁰ Alexander, 46; and Allison, 225.

¹¹ Allison, 12, 45.

¹² Ibid., 68.

¹³ Ibid., 45.

¹⁴ Alexander, 36.

¹⁵ Russell Seitz and Tom Clancy, "Five Minutes Past Midnight: and Welcome to the Age of Proliferation," in *The National Interest*, no 26 (Winter 1991/1992): 218.

¹⁶ Alexander, 46; and Allison, 225.

Notes

¹⁷ Brian Jenkins, “Will Terrorists Go Nuclear?”, in *California Seminar on Arms Control and Foreign Policy*, no 64 (October 1975): 4.

¹⁸ Sopko, 224. In 1993, authorities in Hong Kong picked up an advertisement which offered information on hundreds of former Soviet technicians and experts who might be willing to work for “reasonable pay.”

¹⁹ Louis Rene Beres, *Terrorism and Global Security: The Nuclear Threat* (London: Westview Press, 1987), 21; and Seitz, 3-12.

²⁰ Beres, 41.

²¹ Robert Sutton, notes to submitted paper, “Counterstrategies for the Nuclear Terrorist,” Air War College, Counterproliferation Issues elective (Maxwell, AL: Jan 1999).

²² Nuclear Regulatory Commission, “The Rasmussen Report: Reactor Safety Study,” (Washington DC: Government Printing Office, October 1975).

²³ Beres, 39; and The Rasmussen Report.

²⁴ Sutton, notes; and Porter 112-117.

Chapter 3

Chemical and Biological Terrorism

A truck filled with what appears to be light gravel is driven through the streets [of DC] during rush hour or another maximum traffic period. A visible powder does come out through the tarpaulin covering the truck, but the spread of the powder is so light that no attention is paid to it. The driver and his assistance are immunized against the modified force of Anthrax carried in the truck...The truck slowly quarters key areas of the city. Unsuspected passersby and commuters not only are infected, but carry dry spores home and into other areas. By the time the first major symptoms of the attack occur some 3-5 days later, anthrax pneumonia is epidemic and some septicemia anthrax has appeared. Some 40-65% of the exposed population dies and medical facilities collapse causing serious, lingering secondary effects.¹

—Anthony Cordesman

While some analysts still proclaim that the difficulties of chemical or biological (CB) agent dissemination make their use unlikely, others believe that the ease of agent procurement will lead terrorist organizations to overcome these difficulties.² By any measure, chemical and biological weapons offer more bang for the buck than either conventional or nuclear weapons. CB weapons can cause a far greater number of casualties per dollar than conventional weapons. Their use also guarantees greater media coverage due to the shock effect.³ It is estimated that conventional weapons cost \$2000 per square kilometer destroyed whereas a biological weapon can be had for as cheaply as \$1 per square kilometer with the cost of nuclear and chemical weapons falling in between.⁴ Furthermore, biological and chemical weapons offer qualities that

conventional explosives do not. For example, these weapons can spare property and surroundings. Alternatively, they can make ground uninhabitable for long periods of time. Bioweapons can be used covertly and a second strike conducted before the victim even realizes that he has been hit.

Unlike biological weapons which have a centuries-old history, chemical warfare began in 1915 when the Germans generated chlorine gas clouds on the battlefield. Over one million casualties are attributed to the use of chemicals in World War I.⁵ After 1918, countries continued to develop chemical capabilities but the weapons were not in general use until the Iran/Iraq war of the 1980s. The CB threat to US forces was highly publicized during the Gulf War. Since then, terrorist organizations have further revived interest in the weapons.

Chemical agents are toxic substances that exist in solid, liquid, or gas form. They can be either lethal or nonlethal and can be characterized in several ways.⁶ Non-lethal agents include riot agents and tear gas.⁷ Lethal chemicals fall into the general categories of choking, blood, blister, or nerve agents. Chlorine is a choking agent that causes fluid in the lungs and eventual death by suffocation. Cyanide is a blood agent that prevents cells from properly using oxygen. Blister agents, such as mustard gas, affect the eyes, lungs, or skin. Sarin and VX are deadly nerve agents which are either absorbed through the skin or through respiration. A small fraction of a single drop of VX absorbed through the skin and into the bloodstream will kill its victim almost instantly by paralyzing the central nervous system.⁸ These are some of the most lethal substances known to man.

Chemical agents are most hazardous when they attack the body passively, that is, through inhalation or through the skin or eyes rather than orally. Chemical agents can be

either persistent or non-persistent. A non-persistent agent evaporates quickly and may only remain a hazard for a matter of hours. A persistent agent, on the other hand, can remain lethal for weeks. The persistency of an agent can be improved by mixing the chemical with thickening additives. Effectiveness and persistency of the chemical weapon is dependent upon proper environmental conditions. The presence of vegetation, temperature extremes, moisture, and sunlight may limit or enhance the weapon's effectiveness.⁹ The most lethal attack would take place at night, with known light winds into a populated area. An indoor attack into an enclosed space could also be quite deadly. The amount of dosage will also determine the weapon's effectiveness.¹⁰ With the presence of enough agent, a chemical weapon will overcome a person's mask, filter, and protective gear.

Many chemicals are simple to produce. The technical knowledge is available on the Internet. The need for specialized equipment is minimal, because standard chemical processes are involved.¹¹ Reactor vessels and distillation equipment would be needed. Filters would separate and purify the chemicals and heat exchangers used to control temperature. The remainder of the equipment needed includes pumps, pipes, and valves to move the agent through the production area. A typical nerve agent facility closely resembles a pesticide plant due to the similarity of the compounds.¹² Identifying a chemical weapons production plant would be difficult.

While the most deadly of the chemical agents cause death within moments of exposure, delivering a chemical weapon is somewhat problematic for non-state, resource limited terrorists. Chemicals can be combined with bombs, rockets, mines, or mortars.¹³ But like the World Trade Center bomb, the resulting explosion often destroys the agent in

the process. The best means of delivery may be by aerosol.¹⁴ An agricultural sprayer or even a room defogger could be loaded with enough chemical agent to cover a broad area.¹⁵ Although VX is deadly, it is beyond the means of most terrorists to manufacture. It is also so toxic that it might deter smugglers from attempting procurement. Standard chemical agents that might be within the ability of the terrorist do not inflict the same quantity of destruction as nuclear or biological weapons.¹⁶ However, the use of a chemical weapon, even one of limited destructiveness, would offer shock value.

A more potent and perhaps more probable weapon for terrorists is the biological agent. A biological weapon consists of a microorganism or toxin. A microorganism is living matter such as anthrax, while a toxin is the poison produced by a living organism.¹⁷ There are six general categories of bio-agents: bacteria, fungi, rickettsiae, chlamydia, viruses, and toxins.¹⁸ Anthrax, plague, and tularemia are some of the better known examples of bacteria. Viruses include smallpox and ebola, while Ricin and botulinum are toxins.¹⁹ Many of these agents are simple to manufacture and produce, requiring only a basic knowledge of biology.²⁰ In fact, the US Army's patent for Ricin, which can be made from castor beans with ordinary kitchen materials, is on the Internet.²¹

In order to grow a biological culture, the terrorist first acquires the agent sample. This can be done by collection, theft from a hospital or research center, or via mail order.²² The organism is placed in a medium for fermentation growth. A centrifugal separator separates the resulting cells which are then converted for storage.²³ All of the equipment required for this process is dual-use, which makes the bioweapon facility nearly impossible to detect. A bioproduction facility could make wine, beer, dried milk,

food or other agricultural products as a cover.²⁴ Human intelligence may be the only reliable method of uncovering a covert production facility.

The defense against bioweapons is limited for several reasons. There are three basic types of medical protection against biological agents. Antibiotics can be administered to relieve effects, but they are not an effective treatment against viruses or toxins. Vaccines are best administered before the attack. These cause the body to produce antibodies. Immunoglobulins can be injected. These existing antibodies stimulate host production, providing short-term protection against a specific agent.²⁵ However, there are many agents for which there is no vaccine. We do have vaccines for anthrax and botulinum toxin; however, once a biological agent has been produced, the terrorist can use genetic engineering techniques to alter the cells, thus producing new pathogens for which we have no vaccine.²⁶ Biological agents have an incubation period between delivery and effect. While some agents bring on illness in a matter of hours, others take weeks before symptoms appear. Many bioweapons initially cause flu-like symptoms which leads medical personnel to misidentify the illness and treat without taking personal precautions. Thus, the first responders and medical personnel become the most likely second wave of casualties. The chaos and confusion generated by seemingly natural deaths occurring and spreading uncontrollably make this form of WMD terrorism powerful.²⁷

Biological weapons are great terror weapons for several reasons. First, a delivered agent may not be visible or detectable. How do you cordon off an area if you don't recognize what has been contaminated? Detector technology is still in its infancy. The few units in existence only detect a limited number of agents.²⁸ Once an outbreak has occurred, unless a group claims responsibility, it may take weeks before epidemiologists

can determine whether the disease distribution is abnormal or not.²⁹ The effects of many agents mimic endemic diseases, and even if authorities concede the presence of a bioweapon, the terrorist can plausibly dispute involvement. Furthermore, effects of the weapon may be delayed. Thus, while a conventional bomb has immediate effects, a biological aerosol mist might not cause casualties for several weeks further confusing the situation. Biological agents are uncontrollable. Because they are living organisms, once they find a host they self-replicate. This multiples the effect of the bioweapon.

Biological agents can be spread in several ways. Like chemicals, it is difficult to effectively deliver a biological weapon via explosive, however, armies around the world have conquered the technical difficulties. Infected rodents, fleas, or mosquitoes can be released in the populated target to spread disease. The Rajneesh cult in Oregon spread salmonella by carrying agents into restaurants in paper bags and then contaminating salad bars with their contents.³⁰ Alternatively, bioagents can also be spread by aerosol or respiration. This method is easily within the capability of most terrorist organizations.

Biological weapons do, on the other hand, present several problems for would-be WMD terrorists. One technical problem with delivery by air is the small particle size required. Aerosol particles can't be too large or they won't be inhaled. If they're too small, they remain in the lungs without causing incapacitating damage.³¹ Generally, particles in the one to five micron size are most effective.³² Biological agents are also dependent on the external environment. Sunlight will kill many bio-agents. Wind, rain, and temperature may also affect their effectiveness. The bio-agents also present a potential risk to the terrorists if they do not use proper protection techniques; however, anthrax, botulin, and several other lethal agents could easily be produced in a relatively

unsophisticated Level 2 environment.³³ Since biological agents replicate after dispersal, they also have unpredictable secondary effects. This may enhance or detract from the terrorist's mission depending upon his motives and objectives. These unpredictable effects are exacerbated by the variability of human response to any particular biological agent. Furthermore, some biological weapons also render the area uninhabitable. Anthrax spores, for example, can live dormant for years.³⁴ This may or may not be important to the attacker. If the terrorist is a Middle Easterner with a hatred for Americans, an anthrax attack on Washington might serve his goals nicely.

Biological agents are the most lethal weapons in history. Saddam is said to have produced enough botulinum toxin to kill every living being several times.³⁵ The best attack may be at a location with a high population density, a confined space, and a controlled environment.³⁶ A persistent, infectious weapon with known characteristics could make the attack's effects more predictable.³⁷ Both biological and chemical weapons offer an attractive alternative to the terrorist since they don't have the associated financial or technological challenges of a nuclear weapon. Not only is the terrorist's WMD attack guaranteed to garner ample airtime through the media, but a single chemical or biological attack would also demonstrate his ability to harness WMD and provide the terrorist with a precious bargaining chip.

Notes

¹ Cordesman, 21.

² Class Handout, "Terrorism with Chemical and Biological Weapons," Air War College, Counterproliferation Issues Elective (Maxwell AFB, Al., October 1998), 50; and Betts, 27.

³ Cordesman, 25.

⁴ Barry R. Schneider, "Passive Defenses Against Chemical and Biological Attacks," in "Future War and Counterproliferation: US Military Responses to NBC Proliferation

Notes

Threats," Draft Copy (Maxwell AFB, Al: Air War College, 1998), Chapter 5, 24; and Davis, 9.

⁵ Class Handout, "The Biological / Chemical Threat," Air War College, Counterproliferation Issues Elective (Maxwell AFB, Al., October 1998), 23.

⁶ Federal Emergency Management Agency, "Federal Response Plan: Terrorism Incident Annex," 21, on-line, Internet, <http://www.fema.gov/r-n-r/frpch11b.pdf>.

⁷ "The Biological / Chemical Threat," 27.

⁸ Ibid; and Barry R. Schneider, "Passive Defenses Against Chemical and Biological Attacks," 22-24.

⁹ "The Biological / Chemical Threat," 25-6.

¹⁰ Robert P. Kadlee, "Twenty-First Century Germ Warfare," in *Battlefield of the Future*, ed. Barry R. Schneider and Lawrence E. Grinter. (Maxwell AFB, Al: Air University Press, September 1995), 2, on-line, Internet, <http://www.airpower.maxwell.af.mil/airchronicles/battle>.

¹¹ "The Biological / Chemical Threat," 30.

¹² Ibid.

¹³ Ibid., 28.

¹⁴ Ibid., 23.

¹⁵ Ibid.

¹⁶ Betts, 31.

¹⁷ Mayer, 2.

¹⁸ Davis, 4.

¹⁹ Ibid., 9.

²⁰ Mayer, 1.

²¹ Cordesman, 27.

²² Sopko, 223.

²³ "The Biological / Chemical Threat," 5-7.

²⁴ Mayer, 8.

²⁵ Kadlee, 3-4.

²⁶ Davis, 11; and "The Biological / Chemical Threat," 5-7.

²⁷ Cordesman, 24.

²⁸ "The Biological / Chemical Threat," 1.

²⁹ Davis, 6.

³⁰ Ibid., 3.

³¹ Col Jim Davis, "Biological Warfare," lecture, Air War College, Counterproliferation Issues Elective, Maxwell AFB, Al., October 1998.

³² Kadlee, 2.

³³ Cordesman, 31.

³⁴ Davis, 8.

³⁵ Class Handout, "The Poor Man's Atomic Bomb," Air War College, Counterproliferation Issues Elective (Maxwell AFB, Al., October 1998).

³⁶ Kyle Olson, "The Aum Shinrikyo Attack," lecture, Air War College, Counterproliferation Issues Elective, Maxwell AFB, Al., October 1998.

Notes

³⁷ Davis, 9. An attack with more predictable effects might be desirable to some terrorists. An agent that is stable and doesn't mutate might limit the spread of the resulting illnesses. Likewise, a less persistent agent might cause fewer casualties in a more localized area. A weapon with a known incubation period could also enable terrorists to escape detection or even reattack before the first wave of symptoms even appear.

Chapter 4

The Counter-Strategies

Like all national strategies there are different elements to possible WMD terrorism counterstrategies. This paper will analyze the counterstrategies in the following categories: political, psychological, economic, and military. No single action will completely remove the threat, but a combination of efforts may reduce the risk to more acceptable levels. Furthermore, complementary allied efforts would be more effective than unilateral actions by the US.

Political Strategies

Political counterstrategies include nonproliferation efforts, treaties, test bans and other diplomatic efforts aimed at reducing the probability of WMD terrorism. Traditional arms control approaches do not deter terrorists; however, they may make it more difficult to acquire materials or support.¹ Reduced material quantities and nonproliferation efforts reduce risk. Export controls on materials and technology similarly reduce the terrorist's ability to weaponize. Sanctions and diplomatic efforts may diminish state sponsorship of terrorist activities—potentially eliminating safe havens and terrorist funding sources.

US presidents have often had to deal with the threat or consequences of terrorism. The Iranian hostage crisis and the 1985 hijacking of the Achille Lauro represent memorable examples. Most recently, Presidential Decision Directive 39 (PDD-39)

highlighted US policies towards terrorism and consequence management. PDD-62 further emphasized counterterrorism by defining the roles of involved agencies and establishing a systematic method of fighting terrorism.² In addition, the new national coordination office for counterterrorism should further enhance interagency coordination.

NBC counterproliferation efforts date back to post-WWI when the combatants witnessed the horrifying effects of these weapons. The 1925 Geneva Protocols first addressed biological weapons, but there were two major drawbacks to the agreement. First, the protocols did not address R&D, stockpiling, or weaponization. Secondly, the US was not a signator.³ The US established a biological weapons program in earnest in 1942; however, by 1969 it had become apparent that the uncontrollable aspects of biowarfare and our limited ability to defend against it made the use of such warfare questionable. In 1969, President Nixon announced a unilateral dismantlement of the US offensive biological warfare programs, and renounced the first use of chemical weapons at the same time.⁴ Three years later, the Biological Weapons Conventions (BWC) were negotiated, prohibiting development, production, stockpiling and the acquisition of biological warfare agents for the 103 signing states. The drawback to this agreement is its lack of verification provisions. Currently, compliance is based on voluntarily provided information. Even if unclaimed production facilities can be located, proliferators can claim that they are doing legitimate research.⁵ A 1979 accident at the Soviet Institute of Microbiology illustrated the problems with the BWC. For years, the deaths were attributed to tainted meat. President Yeltsin finally admitted in 1992 that anthrax had accidentally been released.⁶ Diplomats and scientists must continue to work on potential verification measures for the BWC.⁷ The most recent activity

regarding chemical weapons is the 1997 Convention on the Prohibition of the Development, Production, Stockpiling and use of Chemical Weapons and on their Destruction (CWC). Unlike the BWC, this treaty has verification clauses. Its 165 signatories must self-declare sites. The CWC organizations have over 200 inspectors who have conducted over 300 inspections. One-third of these inspections were at US declared sites.⁸ Obviously, the self-declaration provisions require willing participants. Generally, rogue nations or terrorists can easily cheat. Although both the BWC and the CWC have weaknesses, the two conventions do help to steer nations away from chemical or biological warfare, thus helping to reduce the world's CB-weapons supply. Nonproliferation efforts also strengthen the mood of non-approval for these weapons.

On the nuclear side of this issue, US diplomatic pressure could improve progress on nuclear related treaties and agreements. Although the Comprehensive Test Ban treaty was completed in September 1996, it still has flaws that inhibit agreement. The treaty, even if signed by all nuclear nations, does not even address existing stocks of fissile materials.⁹ Nuclear weapons free zones (NWFZ) have been negotiated, but problems with security assurances have delayed signatories.¹⁰ The Russian DUMA has not yet ratified the START II initiatives, and the Clinton administration has been unwilling to pressure them into doing so. Pressure for Russian compliance in conjunction with work on START III would further current nonproliferation efforts. Diplomatic and economic pressure could also be used to convince other nuclear powers to improve the security of their nuclear materials. Fitting all nuclear weapons with self-protecting (PAL-like) devices might ensure that stolen weapons could not be detonated.¹¹

With the largest supplies of nuclear weapons and materials, both the US and Russia need to demonstrate leadership in the area of nuclear limits in order to encourage others to do likewise. Clinton's recent decision to unilaterally abandon all domestic commercial reprocessing and breeder programs was a good start.¹² The problem, of course, is that Russia is in turmoil and the security and elimination of nuclear materials may not be their top priority. A comprehensive US foreign policy program needs to be designed to combat the possibility of nuclear leakage. Diplomatic efforts to decrease and destroy nuclear stockpiles while simultaneously improving security should be accelerated. Ultimately, these efforts would decrease the risk of nuclear terrorism.

The traditional viewpoint is that arms control and counterproliferation efforts do not deter terrorists. Arms control treaties are, after all, agreements between states.¹³ What these efforts do achieve is a reduction in the world supply of WMD materials, heightened global awareness of their danger, and they sow the seeds for negative media attention. A reduction in the world's supply of NBC materials and weapons makes it more difficult for terrorists to acquire or smuggle ready-made weapons or materials. Global awareness might improve counterterrorism efforts, and potential negative media attention might help to steer terrorists away from weapons of mass destruction.

Economic Strategies

Economic strategies can be used to reduce the WMD terrorist threat. The most effective strategy reduces the probability of material acquisition. This can be done through export and import laws and technology controls. In general, international economic efforts to stem proliferation have focused on suppliers. There are a multitude of export control regimes which address the supply issue. The Zannger Committee, the

Nuclear Suppliers Group, the Australia Group, the Missile Technology Control Regime, and the EU Dual Use Regulation Group all provide examples of states attempting to limit free access to WMD materials. Controlling nuclear technologies is somewhat easier since materials and equipment are more readily identifiable, but several organizations have begun to address the chemical and biological issue as well. The 30-member Australia Group has issued a watchlist of materials used in the manufacture of such weapons. The list includes plastics, insecticides, fire retardants, lubricants, pharmaceuticals, detergents, gasoline additives, paint solvents, ceramics, and cosmetics—all of which can be used to develop chemical or biological weapons.¹⁴ The lists also identify reactor vessels, agitators, and storage tanks of specific sizes that might be used to produce viruses or bacteria.¹⁵ The problem of course is that these materials are readily available, they are dual-use, and there is no desire to restrict valid commercial activities. Controls have also focused on military-size procurements.¹⁶ Thus, the terrorist who makes several small purchases would never be noticed. Even materials which are readily identifiable as weapons' precursors present a dilemma. States have a valid need to do research on pathogens and viruses; thus, it is not possible to ban or restrict all biological samples. The samples are, however, much too freely available. Saddam Hussein who now has one of the largest anthrax programs in the world, purchased his initial culture from a US mail order house and it was completely legal.¹⁷ Other terrorists contemplating WMD usage can easily do the same. Counter-strategy economic actions also include sanctions against those who knowingly provide WMD materials to sub-state groups. In July of 1998, Russia investigated the activities of nine commercial companies suspected of smuggling MWD materials. In conjunction with their findings, the US took

punitive actions against seven of the companies.¹⁸ The US should pressure other countries to follow suit.

Since Russia's turmoil seems to offer the greatest probability of terrorist access to WMD materials, the premiere economic strategy would be to take advantage of Russia's economic difficulties and purchase their fissile material and CB stocks. Some experts suggest that this would be less costly than any missile defense or military counterstrategy. The precedent was set with Project Sapphire, which resulted in the outright purchase of 600 kilograms of HEU from Kazakhstan.¹⁹ Another program sponsored by Congressmen Nunn and Lugar in 1991 set up a \$400 million dollar annual budget for nuclear initiatives ranging from improving Russian nuclear security to dismantlement.²⁰ While the intentions of this program are good, its scale is much too small in relation to the threat. The \$400 million represents only 0.02% of the annual US defense budget and bureaucratic restrictions continue to limit the program's effectiveness.²¹ Lobbyists and special interest groups have adversely affected these programs by bickering over prices and trade laws.²² While some limited HEU purchases have been made, the agreements have been plagued by coordination and implementation problems.²³

Besides improving the Nunn-Lugar programs, other economic aid should be used to improve security at Russian nuclear installations. By comparison, the US Department of Energy currently spends almost a billion dollars a year on the security of US nuclear stockpiles which pose much less risk to our security than the unguarded stockpiles in Russia.²⁴ There are several ways to spend money that might yield higher security benefits in this area. The US should put more resources and effort into helping Russia improve the security of its WMD materials. US purchase of excess weapons grade

materials should be increased and accelerated. Finally, the US could help fund the conversion of Russian power plants to low enriched (non-weapons usable) uranium.²⁵

Although economic sanctions have sometimes had limited effectiveness, economic strategies should continue to be used to reduce state sponsorship of terrorist activities. Economic actions definitely have a role to play in countering the risk of WMD terrorism. Any comprehensive program for countering NBC terrorism will include economic actions designed to improve controls and decrease stockpiles.

Psychological Strategies

Psychological strategies involve deterring terrorists by convincing them that they will not achieve their goals if they use WMD. Since terrorists mainly rely upon media attention to garner public attention and support, psychological strategies would attempt to convince potential WMD terrorists that using a nuclear, chemical, or biological weapon would only distance them from their objectives. not achieve their goals. Psychological strategies could emphasize the uncontrollable, indiscriminate nature of the weapons and publicize the harshness of their effects. Well-timed media announcements combined with a release of intelligence information on terrorist activities could reduce terrorist support networks. For example, if the US had released satellite photos or other proof that Sudan was harboring a chemical weapons factory, the Sudanese government might have been compelled to close or move the facility or distance itself from the Bin Laden organization. There is, however, a possible danger of publicizing the effects of WMD. Media attention on the subject might catch the attentions of an extremist organization or fanatical terrorist, thus having the opposite effect of increasing the risk of WMD terrorism.

Highly publicized US anti-terrorist policies may also help deter terrorist actions. Politicians have repeatedly stated that the US will not surrender or make concessions to terrorists; however, the US may have been somewhat inconsistent in following this policy. Reagan's infamous arms-for-hostage deal with Iran provides a glaring example. If the terrorists perceive that US policies are inconsistently followed, they may be encouraged to attempt the use of WMD. Additionally, the US must not be perceived as being weak. The removal of troops from Lebanon following the 1983 truck bombing, and the US withdrawal from Somalia after suffering 19 highly publicized casualties sends a signal that US policies can be defeated simply by causing or threatening mass casualties.

One problem with attempting deterrence through psychological operations involves the concept of rationality. Deterrence in the usual sense assumes rationality on the part of the enemy, but many terrorist groups have a different value system than the traditional state-oriented one with which we are used to dealing.²⁶ Terrorists may be willing to sacrifice themselves or take enormous risks that we would judge to be out-of-proportion.²⁷ Deterrence also assumes a known enemy. WMD terrorists may remain silent until after an attack, and may not even come forward after the attack to claim responsibility. In the case of a bioweapon, we may not even know that we have been attacked. Psychological strategies will not deter all terrorists, but carefully designed and consistent psychological strategies might reduce the likelihood of WMD terrorism.

Military and Law Enforcement Strategies

More forceful strategies for dealing with the WMD terrorist run the gamut from law enforcement to direct military action. Law enforcement includes the actions of the

courts, of police, and of border units. Many states need to strengthen their internal laws regarding WMD materials. Police could be better trained in the WMD threat, and border policing could help reduce the probability of WMD smuggling.

Border policing

Currently, the US has fewer than 10,000 customs inspectors who are expected to monitor the arrival of 1.25 million persons each day, and few of these inspectors are trained to spot WMD materials. Less than 3% of US entries are physically inspected and terrorist organizations know this.²⁸ However, American as well as Russian borders could be better policed and equipped with detection devices. The US could provide border training to other countries to decrease the probability of nuclear leakage. Other counterterrorism assets include US Nuclear Emergency Search Teams (NEST). These teams could be upgraded, better funded, and expanded to improve detection capabilities. Some experts advocate the establishment of a “nuclear Interpol” type of organization which would concentrate on international WMD trafficking.²⁹ Such a group might improve international enforcement and facilitate intelligence sharing. Detection is not easy and these efforts will not be 100% effective; however, better law enforcement actions might serve to deter potential smugglers and terrorists considering WMD actions.³⁰

Court and Legal Changes

There are few controls currently placed on the precursor materials needed for biological and chemical weapons. There are few laws that address this area of proliferation, either in the US or abroad. Japan had no laws regarding Aum Shinrikyo’s manufacture of biological agents. In fact, Japan’s religious freedom laws hindered any type of police

investigations into the matter.³¹ Similarly, in the US materials are freely available to terrorists. Any potential terrorist can order by mail a biological sample. An anthrax culture by mail costs only \$45.³² Indeed, Saddam Hussein's first anthrax culture was shipped to Iraq from the US by overnight mail!³³ Terrorists can also gain samples through theft. Any researcher or hospital worker could pick up a sample at a lab, hospital or university.³⁴ Some doctors are even prescribing toxins for therapy and treatment. These materials are easy to get ahold of and there are few controls or documentation required for their purchase. Obviously, controls and regulations need to be strengthened to help deter and prevent unauthorized persons from obtaining the materials necessary to build a weapon. Criminalization of certain materials needs to take place.³⁵ Licensing for valid research concerns might also help. Documentation for the sale and transport of WMD samples and materials needs to be required. Additionally, international laws must be strengthened to deal with WMD terrorists. There are currently 11 major multilateral conventions addressing terrorism which serve as a basic framework for issues such as extradition, hostage taking, air and maritime safety.³⁶ These conventions need to be expanded and strengthened.

Police Training

The Department of State takes the lead for terrorism overseas. Similarly, the FBI is currently designated as the lead law enforcement agency for all domestic terrorist incidents.³⁷ However, local police organizations will be intimately involved in domestic terrorism as they will likely be first on the scene. During a recent exercise, the US Army conducted 4 simulated attacks against US cities in which anthrax-like particles were covertly delivered. None of the attacks were challenged and results indicated that each

attack would have resulted in thousands of deaths.³⁸ Obviously, awareness needs to be increased. Police need to be trained in countering WMD terrorism and handling WMD events after they occur. Security might also be improved. Much as the Atlanta Olympics had multiple agencies ready and trained to handle a terrorist event, other large gatherings should have similar emphasis on event response/prevention placed upon them.

Military Options

Military options include deterrence, preemption, direct action, and civil response assistance. Deterrence rests on both the capability and perceived will to respond to terrorist actions. Some analysts suggest that Qadhafi decreased his overt sponsorship of terrorism after President Reagan's strike on Libya. President Clinton's recent Tomahawk strikes against Bin Laden's training sites in Afghanistan and chemical agent production facility in Sudan may deter future terrorist acts. Alternatively, these largely symbolic attacks against terrorism might inspire new hatreds against US interests. Military preemption and direct action both offer an avenue for setting back terrorist organizations bent on acquiring nuclear capabilities; however, some triggering event must usually occur to provoke or justify a preemptive US strike. Special operations forces, on the other hand, can be used to covertly destroy terrorist capabilities, but their actions rely on superior intelligence which is often difficult to obtain.

Preemption actions are high risk and should only be taken after policy makers have addressed several questions such as: Is the action feasible? Is it a vital US interest? Do we have adequate intelligence information? Have other options been fully considered? Do we have clear objectives and will the action facilitate success? What are the risks?³⁹ Preemption actions are tempting because they are active measures vice responsive

actions. Who in the Western world would downgrade the importance of Israel's attack on the Iraqi Osirak reactor? Other instances of preemption include Iraq's attack on the Iranian Bushehr reactor, which completely destroyed the facility. Gulf war targeting was also largely built upon preemptive destruction of Iraq's WMD capabilities.⁴⁰ The success of Gulf War preemption action, however, is debatable.

The military has a great number of resources available to assist counter-efforts against WMD terrorism. The Theater Army Medical Lab, the US Army Medical Research Institute of Infectious Diseases (USAMRIID), the US Army Research Institute for Chemical Defenses, the US Navy Medical Research Institute (NMRI), and the US Army Technical Escort Unit for Toxic Chemicals are but a few examples of the organizations within the military that can provide expertise and knowledge.⁴¹ The military also has a large contingent of knowledgeable, trained individuals in the area of event response. After the Aum Shinrikyo bombing, many people in the military readdressed the domestic WMD threat. In 1995, General Krulak of the Marine Corps felt the threat was so great that he established the Chem-Bio Incident Response Force (CBIRF) without specific tasking or funding to do so.⁴² This unit of 300 trained responders is now a national asset directed by the National Command Authority.⁴³ The Army also has two teams that are available upon civilian request to aid in counterterrorism activities.⁴⁴ In addition, the Special Operations Command has a variety of assets trained and focused on counterterrorism.

Detection and Defense

The Secretary of Defense recently approved a one billion-dollar increase over five years for counterproliferation efforts. Almost three-quarters of this money will go

towards passive defenses against chemical and biological attacks.⁴⁵ Passive defense includes not only protection gear such as masks, boots, and suits but also decontamination equipment, treatment, and detection devices.⁴⁶ Unfortunately, detection technology is still in its infancy. Although the Department of Defense has several systems in procurement, none of them are fully accurate or fully capable of detecting any but the most rudimentary of samples. The military's Biological Integrated Detection System (BIDS) samples, analyzes and identifies only a handful of agents, and most of these units are being initially sent to South Korea.⁴⁷ The Fox NBC Reconnaissance System uses a mobile mass spectrometer to detect 60 different chemicals and it is envisioned that this unit would be assigned and travel with forward deployed units. Two hundred were initially planned for acquisition, but that number has diminished as costs have increased.⁴⁸ One problem with any detection system is that there are hundreds of chemical and biological agents that a terrorist might use. And even if the equipment is capable, it could take hours if the equipment is on site to identify the presence of an agent.

Treatments include both pre- and post-attack vaccines. While we have vaccines and/or antidotes for some agents like anthrax, tularemia, and plague, vaccines assume either the general population is vaccinated or there is some foreknowledge of the attack location. In addition, the vaccine must be available in sufficient quantity. One other factor that must be considered in the case of biologicals is the ability to modify the nature of the agent thus rendering known vaccines useless. FDA approval for a vaccine typically takes 10 to 15 years. Most of the vaccines we have for biological weapons have not undergone the requisite human testing to gain FDA approval, and thus are considered

investigational drugs (IND).⁴⁹ Attempting to vaccinate a general populace with an investigational drug, even if forewarned of an attack, would be problematic. In addition, a sufficiently high dose of a biological agent can overwhelm any vaccine.⁵⁰

While better defenses might cause the terrorist to seek a softer target, it is not possible to fully defend everywhere against a terrorist attack. Clearly, more emphasis needs to be put on detection systems. Knowing an agent is out there and identifying its type is fundamental to proper response.⁵¹ Accurate detection combined with timely and complete intelligence is the first and most crucial step in responding to a WMD terrorist attack.

The Importance of Intelligence

Since both law enforcement and military actions depend upon superior intelligence, increased emphasis and budget needs to be placed on nuclear and terrorism focused intelligence. Terrorist organizations may be particularly hard to penetrate due to their ability to assimilate into the surrounding civilian infrastructure. The military appears to have a fascination with technical means of acquiring intelligence; however, simple HUMINT may prove the most effective means of gathering accurate information on potential nuclear terrorists. It is also essential to orient intelligence organizations more towards researching potential clues that might indicate nuclear interests. Much as Hitler's *Mein Kampf* and Timothy McVeigh's interest in the *Turner Diaries* were virtually ignored before they made history, law enforcement agencies neglected clues left by the Aum Shinrikyo organization.⁵² Prior to the chemical attack in Tokyo, there were ample indicators that Aum Shinrikyo had been acquiring chemical and biological weapons and equipment. They were openly shopping for WMD materials in both Russia

and Japan, and yet, as one western intelligence official stated, Aum Shinrikyo was “not on anyone’s radar screen.”⁵³ One problem was the lack of coordination and responsibility among nations and agencies. In the US case, the FBI viewed organizations like Aum Shinrikyo as a CIA responsibility. The CIA, on the other hand, viewed them as an internal Japanese domestic problem, even though Aum Shinrikyo had repeatedly voiced strong anti-American sentiments. Once the attack occurred, the CIA Counterproliferation Center claimed the organization came under the purview of the CIA Counterterrorism Center who in turn passed it off to the regional desk.⁵⁴ As a result, Aum Shinrikyo was free to produce and procure illicit WMD materials without the direct interest of either US or Japanese police or military organizations.

Event Response

Another facet of any counterterrorism strategy involves both civil and military event response teams. Obviously, the better prepared we are as a nation to handle a WMD incident, the better chance the US has of deterring WMD terrorism. The fiscal year 1999 budget includes \$10 million to study National Guard support to civil first-responders. The National Guard will put together up to 170 chemical, biological, reconnaissance and decontamination teams for domestic and overseas response by the year 2000.⁵⁵ These teams will complement the already existing Guard Rapid Assessment and Initial Detection teams (second responders). US first-responders, both civil and military, need better coordination, communications, equipment, and training for the WMD terrorist threat. Fire Chief Mario Trevino of the Las Vegas Fire Department stated that before 1998, his community had massive interagency coordination problems, low preparedness, and no comprehensive plan for handling a domestic WMD incident. His community has

since focused on the problem as a result of WMD threats made by local extremist groups.⁵⁶ Civil responders across the country need basic WMD awareness training, to include such fundamental things as how to wear suits and masks while responding to an attack. Military professionals may be best poised to provide this initial training. Military and law enforcement agencies are key to any comprehensive counterterrorism strategy.

Although recently the President established a National Coordinator Office for counterterrorism, there are still some improvements that could be made to handle a specific WMD incident. FEMA is tasked by the Federal Response Plan to take charge during national emergencies or disasters declared by the president. This Consequence Management authority of the FEMA could conflict with the FBI's lead status during Crisis Management.⁵⁷ Currently, the law gives the DOD lead agency status for domestic preparedness against WMD. The DOD has given this responsibility to the Special Operations and Low Intensity Conflict office, which will focus on response preparedness and training of civil responders.⁵⁸ In addition, the Department of Energy, Human and Health Services, the Environmental Protection Agency are all tasked in some way with crisis response for WMD terrorism. The EPA is tasked to aid first responders, to help plan, train and provide resources during crises.⁵⁹ The FBI can call in Domestic Emergency Support Teams and FEMA may activate Emergency Support Teams and national Emergency Response Teams. The Department of Health and Human Services also has 3 NBC response teams.⁶⁰ Imagine the confusion generated when these folks join the multitude of local responders during crisis response situations. In addition, there are the local first responders which includes police, fire fighters, and medical personnel. And since the locals will undoubtedly be on the scene first during the crucial initial hours

when people might be saved, they are the ones most in need of training.⁶¹ Local responders need to have quick access to experts in biological and chemical warfare. They will require the services of trained biologists, technologists, and medical experts.⁶² Certainly, there needs to be exercise training and a comprehensive national training and education office for WMD response. A coordination center must address not only counterterrorism in general, but the specific issues of WMD terrorism.

Notes

¹ Beres, 27.

² "Federal Response Plan: Terrorism Incident Annex," 1; and The White House, "PDD-62: Combating Terrorism," Critical Infrastructure Assurance Office (Washington DC: White House Press Release, 22 May 1998), 1.

³ Davis, 2.

⁴ US Arms Control and Disarmament Agency, Fact Sheet, "Biological Weapons Convention," 2, on-line, Internet, <http://www.acda.gov/treaties/bwc1.htm>.

⁵ "The Biological/Chemical Warfare Threat," 7.

⁶ Davis, 2.

⁷ "The Biological/Chemical Warfare Threat," 11.

⁸ US Newswire, "Text of Clinton Letter on Weapons of Mass Destruction," (12 November 1998), 4, on-line, Internet, <http://www.usnewswire.com/topnews>.

⁹ William Epstein, "CTB: Next Steps" in *World Politics 97/98*, ed. Helen Purkett. (Guilford, CT: Dushkin/McGraw Hill, 1997), 232-233.

¹⁰ Epstein, p. 233. The Southeast Asian NWFZ has yet to be signed by the five major nuclear powers, and Russia still has not signed the African NWFZ treaty.

¹¹ Alexander, 37.

¹² Ibid., 42.

¹³ Cordesman, 7.

¹⁴ US Arms Control and Disarmament Agency, Fact Sheet, "Biological Weapons," 1-2, on-line, Internet, <http://www.acda.gov/factshee/wmd/bw/auslist.htm>.

¹⁵ Ibid., 3-7; and "The Biological/Chemical Warfare Threat," 5.

¹⁶ Cordesman, 26.

¹⁷ Mayer, 1.

¹⁸ "Text of Clinton Letter on Weapons of Mass Destruction," 9.

¹⁹ Public Broadcasting Station, "Loose Nukes," WGBH/Frontline, 1998; on-line, Internet, available at <http://www.pbs.org/wgbh/pages/frontline/shows/nuke/maps/rc.html>

²⁰ James L. Bacon, "Cooperative Threat Reduction," Program Manager for Chemical Demilitarization, (July 24, 1998); on-line, Internet, available at <http://www-pmc.apgea.army.mil/graphical/CTR/index.html>.

²¹ Allison, 128.

²² Ibid., 103.

Notes

²³ Another problem with buying Russian materials is the lack of accounting the Russians have apparently done with their nuclear materials. There is evidence that Russian inventories were accounted for in terms of rubles and not weighed. Furthermore, nuclear facility managers were known to have understated quantities of fissile material so that these amounts could be used later to compensate for production shortfalls if need be. Several Russian nuclear inspectors state that they have on occasion found sealed barrels empty which were supposed to have nuclear materials in them. Senior Russian officials have admitted that they do not know exactly how much weapons grade material is in their custody. Sopko, 224.

²⁴ Allison, 129.

²⁵ Alexander, 44-49. With the availability of uranium in the market today, there is no commercial or economic reason to operate or build plutonium-based power plants. Eliminating plutonium in civilian reactors would eliminate the recycling of plutonium. Low enriched, non-weapons grade, uranium could be used without degradation in power plant efficiency.

²⁶ Sopko, 226; Cordesman, 5.

²⁷ Cordesman, 7.

²⁸ Allison, 65; and Institute for National Strategic Studies, *1998 Strategic Assessment: Engaging Power for Peace*, (Washington DC: National Defense University, 1998), 208.

²⁹ Allison, 16.

³⁰ Ibid., 93.

³¹ Olson lecture.

³² "The Biological/Chemical Warfare Threat," 8.

³³ Mayer, 1.

³⁴ Sopko, 223.

³⁵ Ibid., 223, 227.

³⁶ US Department of State, "International Terrorism Conventions," (Washington DC: Department of State Office of the Coordinator for Counterterrorism, Aug 17, 1998), 1-4, on-line, Internet, <http://www.state.gov/www/global/terrorism>.

³⁷ Chris Seiple, "Consequence Management: Domestic Response to Weapons of Mass Destruction" in *Parameters*, US Army War College Quarterly, (Autumn 1997), 2.

³⁸ Cordesman, 32.

³⁹ Barry R. Schneider, "Summary," in McNair Paper #41, "Radical Responses to Radical Regimes: Evaluating Preemptive Counterproliferation" (Washington DC: Institute for National Strategic Studies, May 1995), 2; and Barry R. Schneider, "Future War and Counterproliferation: US Military Responses to NBC Proliferation Issues," Air War College, Maxwell AFB, Al, 1998, Chapter 4, 9-14.

⁴⁰ Barry R. Schneider, "Summary," 1.

⁴¹ "Terrorism: Is America Prepared?" 3.

⁴² Seiple, 1,4.

⁴³ Barry R. Schneider, "Passive Defenses Against Chemical and Biological Attacks," 40.

⁴⁴ Ibid., 52.

Notes

⁴⁵ Ibid., 7.

⁴⁶ "The Biological/Chemical Warfare Threat," 30.

⁴⁷ Barry R. Schneider, "Passive Defenses Against Chemical and Biological Attacks," 48-49; and Cordesman, 32.

⁴⁸ Barry R. Schneider, "Passive Defenses Against Chemical and Biological Attacks," 49-50.

⁴⁹ Kadlee, 2.

⁵⁰ Ibid., 3.

⁵¹ Mayer, 9-10.

⁵² "Terrorism with Chemical and Biological Weapons," 99.

⁵³ Ibid.; and Sopko, 226.

⁵⁴ Sopko, 226.

⁵⁵ David Ruppe, "Guard to Play Major Counter-Terror Role," *Defense Week*, 19 October 1998, 1.

⁵⁶ National Terrorism Preparedness Institute, "WMD: Terrorism in American Cities," Video Tape, International Association of Fire Chiefs, 15 September 1998.

⁵⁷ "Federal Response Plan: Terrorism Incident Annex," 1; and "Terrorism: Is America Prepared?" 3.

⁵⁸ Seiple, 6-7. Public law #104-201, also known as "The Defense against WMD Act," was enacted after the Atlanta Olympic games. It designates DoD as the lead agency for domestic preparedness against weapons of mass destruction until 1999. The office of Special Operations and Low Intensity Conflict instituted the structure for managing domestic preparedness. Federal funds will be used for response preparedness and training for 120 cities. There is some question regarding who will take the lead from the DoD after 1999 since this has not yet been addressed.

⁵⁹ Environmental Protection Agency, "EPA's Role in Counter-Terrorism," fact sheet, July 1998, on-line, Internet, <http://www.epa.gov/swercep/cntr-ter.html>.

⁶⁰ "Federal Response Plan: Terrorism Incident Annex," 7, 10.

⁶¹ Seiple, 9.

⁶² Kadlee, 8.

Chapter 5

Conclusions

WMD terrorism has traditionally fit into the “high risk-low probability category.”¹

Experts in the 1980s concluded that terrorism simply didn’t kill enough people to get overly concerned; thus, attention has been focused on more traditional threats.² However, several things have changed to make the WMD terrorist threat a more real possibility. First, America’s profile and especially our military footprint, has greatly increased. With the fall of the Soviet Union, America has accepted responsibilities for helping resolve conflicts all over the globe with American forces and resources. American power and involvement can inflame terrorist hostilities. The breakup of the Soviet Union also provides potential terrorists greater access to WMD materials, technologies, and expertise. And, in the aftermath of the Gulf War, America’s perceived intolerance for casualties might further encourage WMD terrorism.

Civil and military organizations need to become more aware of and focused on the WMD terrorist threat. Terrorist organizations with deep hostilities towards the US obviously deserve the closest attention. Groups who are isolated and who indicate evidence of paranoia might also be motivated to acquire and use weapons of mass destruction. Racial supremacist groups, groups with dictatorial charismatic leaders, and those demonstrating ethnic and religious extremism might be most likely to seek weapons

of mass destruction.³ Currently, responsibility for the WMD terrorist threat is divided amongst different organizations.⁴ Combatting WMD terrorism involves facets of technology, national security, intelligence, the military, and civil law enforcement.⁵ Better planning, improved coordination among agencies, and a more comprehensive national strategy needs to be developed to reduce the risk.

If the US wants to be free to pursue its goals with impunity, the WMD terrorist threat must be addressed. There are many possible actions to reduce exposure to WMD terrorism. Political, economic, psychological, law enforcement, and military counter-strategies must be pursued simultaneously. In addition, these should not be unilateral actions. While a WMD terrorist incident might be a low probability event, the potential risks demand greater attention be placed on this threat to America's national security.

Notes

¹ Kamp, Karl-Heinz, "Nuclear Terrorism-Hysterical Concern or Real Risk," German Foreign Affairs Review, Vol. 46, No. 3; on-line. Internet, available at http://www.isn.ethz.ch/au_pol/kamp.htm.

² Terrorism Research Center, "Terrorism: Can You Trust Your Bathtub," (September 12, 1996), pp. 1-2; on-line, Internet, available at <http://www.terrorism.com/terrorism/bathtub.html>. At a recent conference on combating Terrorism, a speaker noted that less than 2,000 Americans have lost their lives to terrorism

³ "Terrorism With Chemical and Biological Weapons," Class Handout, Counterproliferation Issues Elective, Air War College, 1 Nov 98, 50.

⁴ Sopko, p. 227.

⁵ "Terrorism With Chemical and Biological Weapons," 99.

Bibliography

Allison, Graham T., Owen Cote, Richard Falkenrath and Steven E. Miller., *Avoiding Nuclear Anarchy: Constraining the Threat of Loose Russian Nuclear Weapons and Fissile Material*, Cambridge, MA: MIT Press, 1996.

Alexander, Yonah, Yuval Ne'eman, and Ely Tavin, ed., *Future Terrorism Trends: Analysis of Terrorist Warfare in the World Arena*, Washington DC: Global Affairs, 1991.

“Authorities await Test Results on Threat Mail sent to Clinic,” *Montgomery Advertiser*, 1 Nov 98.

Bacon, James L. “Cooperative Threat Reduction,” Program Manager for Chemical Demilitarization. July 24, 1998. On-line, Internet, <http://www-pmcd.apgea.army.mil/graphical/CTR/index.html>.

Beres, Louis Rene, *Terrorism and Global Security: The Nuclear Threat*, London: Westview Press, 1987.

Richard Betts, “Weapons of Mass Destruction,” *Foreign Affairs*. 77, no. 1, Jan/Feb 1998.

Bowman, Stephen. *When the Eagle Screams: America's Vulnerability to Terrorism*. Secaucus, NJ: Carol Publishing Group, 1994.

Canadian Security Intelligence Service, “Terrorism: Motivations and Causes,” in Commentary No. 53; on-line. Internet, available at <http://www.csiscrs.gc.ca/eng/comment/com53e.html>.

“Chemical & Biological Arms Control Dispatch.” Chemical and Biological Arms Control Institute, October 16-30, 1998. On-line, Internet, <http://www.cbaci.org>.

Class Handout, “The Poor Man’s Atomic Bomb,” Air War College, Counterproliferation Issues Elective. Maxwell AFB, Al., October 1998.

Class Handout, “Terrorism with Chemical and Biological Weapons,” Air War College, Counterproliferation Issues Elective. Maxwell AFB, Al., October 1998.

Cordesman, Anthony H. “Terrorism and the Threat from Weapons of Mass Destruction in the Middle East: The Problem of Paradigm Shifts.” Working Draft, Middle East Studies Program, October 22, 1996.

Davis, Jim. “Biological Warfare,” lecture, Air War College, Counterproliferation Issues Elective, Maxwell AFB, Al., October 1998.

Dees, Morris. *Gathering Storm: America's Militia Threat*. New York: Harper Collins Publishers, 1996.

Encyclopedia of World Terrorism, ed. Martha Crenshaw and John Pimlott. Armonk, NY: M. E. Sharpe, Inc., 1997.

Environmental Protection Agency, “EPA’s Role in Counter-Terrorism,” fact sheet, July 1998, on-line, Internet, <http://www.epa.gov/swercep/cntr-ter.html>.

Epstein, William, “CTB: Next Steps” in *World Politics* 97/98, ed. Helen Purkett. Guilford, CT: Dushkin/McGraw Hill, 1997.

Federal Bureau of Investigation, *Terrorism in the United States: 1996, Counterterrorism Threat Assessment and Warning Unit*. Washington DC: Government Printing Office, 1997.

Federal Emergency Management Agency, "Federal Response Plan: Terrorism Incident Annex," 21, on-line, Internet, <http://www.fema.gov/r-n-r/frpch11b.pdf>.

George, John and Wilcox, Laird. *American Extremists: Militias, Supremacists, Klansmen, Communists, & Others*. Amherst, NY: Prometheus Books, 1996.

Gromer, Cliff and Wilson, Jim. "Weapons of Mass Destruction" in *Popular Mechanics*. 175:80-85, June 1998.

Grosscup, Beau. *The Explosion of Terrorism*. Far Hills, NJ: New Horizons Press, 1987.

Hanle, Donald, *Terrorism: The Newest Face of Warfare*, Washington DC: Pergamon-Brassey's International Defense Pub, Inc., Washington, 1989.

Institute for National Strategic Studies, *1998 Strategic Assessment: Engaging Power for Peace*. Washington DC: National Defense University, 1998.

Jenkins, Brian. "Will Terrorists Go Nuclear?," in *California Seminar on Arms Control and Foreign Policy*, No 64, October 1975.

Kadlee, Robert P. "Twenty-First Century Germ Warfare," in *Battlefield of the Future*," ed. Barry R. Schneider and Lawrence E. Grinter. Maxwell AFB, Al: Air University Press, September 1995. On-line, Internet, <http://www.airpower.maxwell.af.mil/airchronicles/battle>.

Kamp, Karl-Heinz, "Nuclear Terrorism-Hysterical Concern or Real Risk," German Foreign Affairs Review, Vol. 46, No. 3; on-line. Internet, available at http://www.isn.ethz.ch/au_pol/kamp.htm.

Mayer, Terry N. "The Biological Weapon: A Poor Nation's Weapon of Mass Destruction," in *Battlefield of the Future*, ed. Barry R. Schneider and Lawrence E. Grinter. Maxwell AFB, Al: Air University Press, September 1995. On-line, Internet, <http://www.airpower.maxwell.af.mil/airchronicles/battle>.

National Governor's Association Issue Brief, "Terrorism: Is America Prepared?" Washington DC: Natural Resources Policy Studies Division, Feb 2, 1997. On-line, Internet, <http://nga.org/Pubs/IssueBriefs/1997/970202terrorism.asp>.

National Terrorism Preparedness Institute, "WMD: Terrorism in American Cities," Video Tape, International Association of Fire Chiefs, 15 September 1998.

Office of the Secretary of Defense, *Proliferation: Threat and Response*, Washington DC: US Government Printing Office, Nov 1997.

Olson, Kyle. "The Aum Shinrikyo Attack," lecture, Air War College, Counterproliferation Issues Elective, Maxwell AFB, Al., October 1998.

Potter, William C. "Nuclear Leakage from the Post-Soviet States," in *Pulling Back from the Nuclear Brink: Reducing and Countering Nuclear Threats*, ed. Barry R. Schneider and William L. Dowdy. London: Frank Cass Publishers, 1998.

Public Broadcasting Station, "Loose Nukes," WGBH/Frontline, 1998; on-line, Internet, available at <http://www.pbs.org/wgbh/pages/frontline/shows/nuke/maps/rc.html>

The Rasmussen Report, Reactor Safety Study, Nuclear Regulatory Commission, October 1975.

Ruppe, David, "Guard to Play Major Counter-Terror Role" in *Defense Week*, 19 October 1998.

Schneider, Barry R. "Summary," in McNair Paper #41, "Radical Responses to Radical Regimes: Evaluating Preemptive Counterproliferation." Washington DC: Institute for National Strategic Studies, May 1995.

Schneider, Barry R. "Future War and Counterproliferation: US Military Responses to NBC Proliferation Issues," Draft Copy, Air War College, Maxwell AFB, Al, 1998.

Seitz, Russell and Tom Clancy, "Five Minutes Past Midnight: and Welcome to the Age of Proliferation," in *The National Interest*, No 26, Winter 1991/1992.

Seiple, Chris. "Consequence Management: Domestic Response to Weapons of Mass Destruction" in *Parameters*, US Army War College Quarterly, Autumn 1997.

Sopko, John, "The Changing Proliferation Threat" in *World Politics* 97/98, ed. Helen Purkett. Guilford, CT: Dushkin/McGraw Hill, 1997.

Smith, Brent L. *Terrorism in America: Pipe Bombs and Pipe Dreams*. New York: State University Of New York Press, 1994.

Sweet, Kathleen, "Russia: A Multidisciplinary Approach," Air War College Elective, Maxwell AFB: Al, Fall 1998.

Terrorism in the United States, ed. Frank McGuckin. New York: H. W. Wilson, 1997.

Terrorism Research Center, "Terrorism: Can You Trust Your Bathtub." September 12, 1996. On-line, Internet, available at <http://www.terrorism.com/terrorism/bathtub.html>

Torres, Karen. "Russia: A Multidisciplinary Approach," lecture handout, Air War College, Maxwell AFB, Al., Oct 1998.

US Arms Control and Disarmament Agency, Fact Sheet, "Biological Weapons." On-line, Internet, <http://www.acda.gov/factshee/wmd/bw/auslist.htm>.

US Arms Control and Disarmament Agency, Fact Sheet, "Biological Weapons Convention." On-line, Internet, <http://www.acda.gov/treaties/bwc1.htm>.

United States. Congress. House of Representatives. Committee on National Security. Subcommittee on Military Research and Development. *The Federal Response to Domestic Terrorism Involving Weapons of Mass Destruction and the Status of the Department of Defense Support Program*. 105th Congress, 1st session, November 4, 1997. Washington DC: Government Printing Office, 1998.

US Department of State, "International Terrorism Conventions." Washington DC: Department of State Office of the Coordinator for Counterterrorism, Aug 17, 1998). On-line, Internet, <http://www.state.gov/www/global/terrorism>.

US Department of State, *Patterns of Global Terrorism: 1997*. Washington DC: Government Printing Office, April 1998.

US Newswire, "Text of Clinton Letter on Weapons of Mass Destruction," (12 November 1998), 4, on-line, Internet, <http://www.usnewswire.com/topnews>.

The White House, "PDD-62: Combatting Terrorism," Critical Infrastructure Assurance Office. Washington DC: White House Press Release, 22 May 1998.

DISTRIBUTION A:

Approved for public release; distribution is unlimited.

Air War College
Maxwell AFB, AL 36112